

REMARKS

Claims 1, 3, 4, 11, 20 and 24 have been amended to more clearly define the invention. Claims 7 and 8 have been cancelled without prejudice of that which they define.

More particularly, Claim 1 has been amended to include load and wear properties, previously recited in Claims 7 and 8 (now cancelled). Support for this amendment can be found at page 10, lines 12-22 of the specification. Claim 3 has been amended to correct a typographical error in a chemical formula. Support for this amendment can be found in formula IV at page 10 of the specification. Claim 4 has been amended to correct its antecedent basis. Claim 11 has been amended to correct a minor typographical error. Claim 20 has been amended to include a claimed range of chemically unbound sulfur. Support for this amendment can be found in originally filed claims 5 and 11. Claim 24 has been amended to include a lubricating load property. Support for this amendment can be found at page 10, lines 9-15, of the specification.

The Authorized Officer found that Claims 1-24 have novelty under PCT Article 33(2) and industrial applicability under PCT Article 33(4), for which Applicant is grateful. However, the Authorized Officer found that those claims lack inventive step under PCT Article 33(3). Applicant traverses that finding and respectfully requests reconsideration and withdrawal thereof based on the remarks to follow.

Response to Lack of Inventive Step Objection

The Written Opinion alleges that claims 1-24 lack inventive step under PCT Article 33(3) as being obvious over U.S. Patent No. 4,416,788 to Apikos and U.S. Patent No. 5,726,130 to Yamanaka, considered separately.

Apikos is directed towards a lubricating oil composition for heavy duty metal working. ('788 Patent, column 1, lines 5-9). The composition has an oil with a viscosity of 50 to 1,000 SUS at 100°F. ('788 Patent, column 2, lines 2-5). The composition also includes 0.1 to 1.5 weight percent elemental sulfur. ('788 Patent, column 3, lines 45-46). Further, the composition is described as including a lubricity additive having at least one ester component. ('788 Patent, column 4, line 47 to column 5, line 12). Moreover, the composition is described as including other ingredients, such as corrosion inhibitors. ('788 Patent, column 6, lines 3-6).

In examples 3 to 9 at columns 6 to 7, Apikos describes various tapping torque test results. Torques were measured for tapping preformed holes in metal samples. The torque test is described as providing a result for comparing the relative metal cutting lubrication of one composition to another composition. ('788 Patent, column 7, lines 48-51). All of the tests, however, were done on different grades of steel or stainless steel.

In contrast, the present invention is directed towards a lubricating composition with improved load and improved wear properties. Furthermore, the present invention as set forth in independent claim 1 is a lubricating composition which includes, *inter alia*, an oil having a viscosity of about 75 to about 160 cSt at 25°C and free sulfur to provide a Falex reference load of greater than about 4,500 pounds force and a Falex reference wear of less than ten teeth.. Such a combination of load and wear properties and viscosity provides an improved lubricating composition over Apikos.

Apikos fails to teach or suggest such a lubricating composition as set forth in claim 1 of the present invention. More particularly, Apikos fails to teach a lubricating composition with the load and wear properties of the present invention. As shown in Table 5a at page 16 of the present application, the claimed combination of the load and wear properties at the claimed viscosity values were not present in any commercially available heavy duty, active metal working fluids tested by the Applicant. Those commercially available fluids exhibited either a poor load property, a poor wear property or a poor viscosity. Based on current knowledge in the field, one of ordinary skill in the art would not expect Apikos to behave any differently from those fluids tested by the Applicant which did not exhibit the wear and load

properties of the present invention. Moreover, Apikos fails to teach or suggest that its composition would be different from these other commercially available compositions.

Moreover, there is no motivation to modify Apikos to arrive at the present invention as set forth in amended Claim 1. Apikos fails to teach or suggest a lubricating composition having improved wear properties and improved load properties. Apikos teaches a composition with improved tapping torque properties, but fails to teach or suggest improved wear properties. In fact, Apikos even fails to teach or suggest that wear is an extreme pressure property for heavy duty metal working fluids. Therefore, Apikos fails to teach the present invention as set forth in amended claim 1. Thus, reconsideration and withdrawal of the rejection of claim 1 and all claims dependent therefrom are respectfully requested.

The present invention as set forth in amended independent Claim 11 is a composition for lubricating non-ferrous metallic work pieces. The composition includes, *inter alia*, from 0.4 to 12 weight percent free sulfur. The inventive composition does not corrode non-ferrous work pieces even with such claimed levels of free sulfur. As described at page 8, lines 31-33 of the present application, commercially available heavy duty metal working fluids that contain free sulfur are corrosive to non-ferrous metals. Test results on

page 16 of the present application substantially the corrosive nature of typical heavy duty metal working fluids.

Apikos fails to teach or suggest that its lubricating composition is non-corrosive to non-ferrous work pieces. Based on knowledge in the field at the time the invention was discovered, one of ordinary skill in the art would not expect Apikos to behave any differently from those free sulfur-containing fluids tested by the Applicant which corroded non-ferrous work pieces.

Moreover, Apikos fails to teach or suggest that its lubricating composition would even be suitable for non-ferrous work pieces. While Apikos teaches that its lubricating composition would be suitable for certain ferrous work pieces, Apikos fails to teach or suggest that its composition be suitable for non-ferrous work pieces. In fact, it is known that free sulfur is corrosive to non-ferrous metals and it would be expected that Apikos would therefore also be corrosive to non-ferrous metals. To arrive at the present invention as set forth in amended Claim 11, Apikos would have to be modified to what it fails to teach or suggest, i.e., non-corrosivity towards non-ferrous metals.

Further, Apikos fails to teach or suggest a method of making such a free-sulfur-containing lubricant which is non-corrosive to non-ferrous metals, as set forth in

independent Claim 0. Furthermore, Apikos fails to teach or suggest a method of providing non-corrosive lubrication to a non-ferrous metal part as set forth in independent Claim 24.

Therefore, Apikos fails to teach or suggest the present invention as set forth in independent Claims 11, 20 and 24. Thus, reconsideration and withdrawal of the objection based on Apikos of independent claims 11, 20 and 24 and all claims dependent therefrom are respectfully requested.

Turning now to Yamanaka, this patent document is directed towards a cutting or grinding oil composition which includes a base oil having a viscosity of 1.5 to 50 cSt at 40°C, a dibasic or tribasic acid or ester thereof, and a sulfur compound. ('130 Patent, column 1, line 65, to column 2, line 23). One sulfur compound is described as being elemental sulfur in the range of 0.05 to 2 weight percent. ('130 Patent, column 5, lines 53-57). The composition may also include "corrosion inhibitors, such as sorbitane esters, neutral sulfonates, phenates, and salicylates of alkaline earth metals..." ('130 Patent, column 7, lines 49-52).

In contrast, the present invention as set forth in independent Claim 1, is a lubricating composition which includes, *inter alia*, free sulfur to provide a Falex reference load of greater than about 4,500 pounds force and a Falex reference wear of less than ten teeth. The inventive composition also includes an oil having a viscosity of about

75 to 160 cSt at [REDACTED] °C. As described above, [REDACTED] a combination of properties in a lubricating composition represents superior performance over commercially available lubricating compositions.

Yamanaka fails to teach or suggest the composition of the present invention with such load and wear properties. As shown in Table 5a at page 16 of the present application, the claimed combination of the load and wear properties were not present in any commercially available metal working fluid tested by the Applicant. Yamanaka fails to teach or suggest or provide any evidence whatever that its composition would be sufficiently different from the commercially tested lubricants so as to meet the claimed limitations of the present invention. More particularly, Yamanaka fails to teach or suggest a lubricating composition with the claimed viscosity, wear and load properties.

Moreover, to arrive at the present invention Yamanaka would have to be modified to include the claimed wear and load properties. Yamanaka, however, fails to provide any motivation to alter its teachings or suggestions to arrive at a composition having such wear and load properties.

Therefore, Yamanaka fails to teach or suggest the present invention. Thus, reconsideration and withdrawal of the objection of Claim 1 and all claims dependent therefrom

for obviousness under PCT Article 33(3) are respectfully requested.

Further, Yamanaka fails to teach or suggest that its composition is non-corrosive to non-ferrous work pieces. While Yamanaka discloses the use of corrosion inhibitors, it fails to teach or suggest that such corrosion inhibitors would be effective for non-ferrous metals. In fact, it is known that free sulfur is corrosive to non-ferrous metals and it would be expected that Yamanaka would therefore also be corrosive to non-ferrous metals. Moreover, Yamanaka fails to teach or suggest that its compositions would be useful on non-ferrous metals. Yamanaka teaches the use of lubricating compositions on different carbon steels, stainless steels and chromium molybdenum steels at column 8, lines 5-35, but fails to teach or suggest the use of non-ferrous metals. Thus, Yamanaka fails to teach or suggest a lubricating composition which is effective for non-ferrous metals and which is also non-corrosive to non-ferrous metals.

In contrast the present invention as set forth in independent Claims 11, 20 and 24 is directed towards inventive compositions for lubricating non-ferrous metallic work pieces that are non-corrosive to the non-ferrous work pieces, methods for making and using such inventive compositions, the compositions and methods comprise levels free sulfur effective to provide extreme pressure lubricant properties while not

corroding non-ferrous metallic work pieces. Applicant arrived at the present invention, such a non-corrosive lubricant remained elusive to one of ordinary skill in the art.

As demonstrated above, Yamanaka fails to teach or suggest the present invention as set forth in independent Claims 11, 20 and 24. Thus, reconsideration and withdrawal of the objections of Claims 11, 20 and 24 and all claims dependent therefrom are respectfully requested.

In addition, Apikos and Yamanaka, to the extent they were to be taken in combination, fail to teach or suggest the present invention. The combined teachings of these references fail to remedy the above-discussed deficiencies of the individual references. Thus, Applicant respectfully submits that the present invention is patentably distinct therefrom.

#### SUMMARY

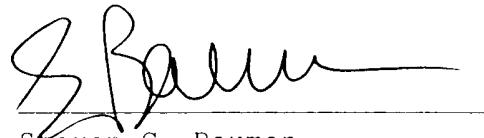
For the convenience of the Authorized Officer, replacement pages 19, 20, 22 and 24 are enclosed. Claim 2 on page 19 remains unchanged. Claims 5, 6, 9, 10, 12 and 13 on page 20 remain unchanged. Claims 18, 19 and 21-22 on page 22 remain unchanged. Claim 23 on page 24 remains unchanged.

Applicant respectfully submits that the present invention is patentably distinct over the cited patent

documents. As [REDACTED], Applicant respectfully requests the issuance of a favorable International Preliminary Examination Report.

Should the Authorized Officer have any questions or comments concerning the amendments set forth above, he/she is invited to contact the undersigned agent by telephone at (860) 571-5001.

Respectfully submitted,



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